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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/098,617	03/18/2002	Masayuki Sakakura	12732-094001 / US5593/561	3682
26171	7590	02/20/2004	EXAMINER	
FISH & RICHARDSON P.C. 1425 K STREET, N.W. 11TH FLOOR WASHINGTON, DC 20005-3500			KEANEY, ELIZABETH MARIE	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/098,617	SAKAKURA ET AL.	
	Examiner	Art Unit	
	Elizabeth Keaney	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-88 is/are pending in the application.
- 4a) Of the above claim(s) 53-88 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 and 41-52 is/are rejected.
- 7) ☒ Claim(s) 35-40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/18/02 and 4/5/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-52, in paper filed 5 November 2003 is acknowledged.

Claims 53-88 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Election was made **without** traverse in paper filed 5 November 2003.

Drawings

Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

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Claims 4 and 7 are objected to because the limitation "the tunnel current or the Fowler-Nordheim current" in lines 9-10 and lines 14-15 respectively, lacks sufficient antecedent basis for this limitation in the claim.

Claims 20-25 and 41-46 are objected to because the limitation "the insulating surface" in line 1 lacks sufficient antecedent basis for this limitation in the claim. The examiner has therefore defined the insulating surface to be the second insulating layer.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Arai et al. (US Patent 6,222,314; hereinafter Arai).

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Arai discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- an insulating layer (4) provided between an organic compound layer (5) and an electrode (2) positioned below the organic compound layer,
 - wherein the insulating layer comprises silicon oxide (column 2, line 30) and has a thickness of 0.1-10nm (column 2, line 39), which is within the claimed range.

Regarding the limitation of the insulating layer allowing a tunnel current, silicon oxide has an excessively large ionization energy and therefore allows for the positive holes injected by the electrode (2) to flow through the insulating layer (4) by a tunnel effect to supply a current to the organic compound layer (5).

Claims 2-13,20-25 and 41-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Urabe et al. (US Patent 6,614,174; hereinafter Urabe).

Re claim 2: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);
- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);

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- an organic compound layer (10) formed on the second insulating layer (15);
- a second electrode (K) formed on the organic compound layer (10),
 - wherein the first electrode (M) and the organic compound layer (10) are connected to each other through a tunnel junction (15; column 7; line 63).

Re claim 3: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);
- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15);
- a second electrode (K) formed on the organic compound layer (10),
 - wherein the second insulating layer (15) has a thickness (column 7, line 63) that allows the first electrode (M) and the organic compound layer (10) to form a tunnel junction.

Re claim 4: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);
- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15);
- a second electrode (K) formed on the organic compound layer (10),
 - wherein the second insulating layer (15) has a thickness (column 7, line 63) that allows a tunnel current or a Fowler-Nordheim current to flow threrethrough.

Re claim 5: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;
- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);

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- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
- a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15); and
- a second electrode (K) formed on the organic compound layer (10),
 - wherein the first electrode (M) and the organic compound layer (10) are connected to each other through a tunnel junction (15; column 7, line 63).

Re claim 6: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;
- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);

- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
- a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15); and
- a second electrode (K) formed on the organic compound layer (10),
 - wherein the second insulating layer (15) has a thickness (column 7, line 63) that allows the first electrode (M) and the organic compound layer (10) to form a tunnel junction.

Re claim 7: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;
- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);

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- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
 - a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;
 - a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
 - an organic compound layer (10) formed on the second insulating layer (15); and
 - a second electrode (K) formed on the organic compound layer (10),
- wherein the second insulating layer (15) has a thickness (column 7, line 63) that allows a tunnel current or a Fowler-Nordheim current to flow therethrough.

Re claims 8-13, 20-25 and 41-46: Urabe discloses the second insulating layer comprising silicon dioxide (column 7, line 62).

Re claims 47-52: Urabe discloses the light-emitting device being incorporated in one selected from the group consisting of a computer, a digital camera, a video camera and a mobile phone (column 1, line 13).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe in view of Segawa (US Patent 6,492,778).

Urabe shows all the limitations as shown above, including an interlayer insulating film.

However, Urabe fails to teach or fairly suggest the interlayer insulating film comprising two layers and an insulating layer comprised of polyimide and acrylic resin.

Segawa discloses the use of an interlayer insulating film having two layers (column 4, line 9) wherein the first layer includes silicon nitride (column 4, line 9) and the second layer includes acrylic resin (column 4, line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a multiple layer insulating film for the interlayer insulating film disclosed by Urabe because the first layer of the insulating film acts as an insulator for the emissive elements and the second layer planarizes the surface of the insulating region located above the emissive elements thereby improving the brightness of the light emitted.

Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe in view of Inukai et al. (US Patent 6,680,577; hereinafter Inukai).

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Urabe shows all the limitations above, including a second insulation layer.

However, Urabe fails to teach or suggest the insulating layer comprised as carbon.

Inukai discloses the use of carbon as an insulating layer (column 31, line 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a carbon insulating layer for the insulating layer of Urabe because by using carbon the insulating layer has light transmissive properties as well as heat radiation effects, thereby improving the insulation property of the layer while not impeding the light emitted from the emitters.

Allowable Subject Matter

Claims 35-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The best prior art of record discloses a light emitting device having two insulating layers, wherein the second insulating layer is formed on a first electrode and the first insulating layer. However, the prior art fails to teach or fairly suggest the second insulating layer has a thickness of 1-10nm.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent 6,416,888 discloses the ability of a silicon oxide insulating layer to allow a tunnel current from the electrode to the organic compound layer.
- US Patent 6,541,918 discloses two insulating layers wherein the second insulating layer is formed over a first electrode and the first insulating layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday-Thursday 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER